FBI Law Enforcement Bulletin

April 1988

A System For Major Disasters

Contents

April 1988, Volume 57, Number 4

FBI

Law Enforcement Bulletin

United States Department of Justice
Federal Bureau of Investigation
Washington, DC 20535

William S. Sessions, Director

The Attorney General has determined that the publication of this periodical is necessary in the transaction of the public business required by law of the Department of Justice. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through June 6, 1988.

Published by the Office of Congressional and Public Affairs,
Milt Ahlerich, *Assistant Director*

Editor—Thomas J. Deakin
Assistant Editor—Kathryn E. Sulewski
Art Director—John E. Ott
Production Manager/Reprints—David C. Maynard

The Cover:

The May 11, 1985, fire disaster at England's Bradford City football ground prompted the creation of the CRISIS computer system. (See article p. 8).

The FBI Law Enforcement Bulletin (ISSN-0014-5688) is published monthly by the Federal Bureau of Investigation, 10th and Pennsylvania Ave., N.W., Washington, DC 20535. Second-Class postage paid at Washington, DC. Postmaster: Send address changes to Federal Bureau of Investigation, FBI Law Enforcement Bulletin, Washington, DC 20535.

ISSN 0014-5688 USPS 383-310

Director's Message

May 1988, is the 27th anniversary of President John F. Kennedy's approval of the law designating May 15 as Peace Officers Memorial Day. The words at Gettysburg of another eloquent, and assassinated, President are appropriate to honor "those who gave their lives that this nation might live."

President Kennedy's predecessor, Dwight D. Eisenhower, had established May 1 as Law Day 3 years before. While the theme of the 1988 Law Day is "legal literacy," one of the purposes of Law Day is to recognize the "support. . . [of] those. . . persons charged with law enforcement." In the decade 1977 to 1986, the FBI's Uniform Crime Reporting system has recorded 875 law enforcement officers feloniously killed. While law enforcement has reduced the 1979 high of 106 officers killed to a new low of 66 officers killed in 1986, this is still an unacceptable number, both in terms of the human tragedy involved and in sheer economics.

It is the duty, and the even greater moral obligation, of every law enforcement chief executive to see that the officers in his or her command have the very best training and equipment available to protect themselves in potentially deadly situations. Two of my predecessors, William H. Webster and Clarence M. Kelley, recognized and advocated the use of ballistic vests and training in night use of firearms. "The decline in officers killed is partially a result of technology, the development of Kevlar, the ballistic fiber used in soft body armor," according to FBI Director Webster, writing in this journal. Ten years before, Director Kelley pointed out that nighttime "and dimly lit situations predominate the encounters that prove fatal to law enforcement personnel." For this reason, the FBI then placed greater emphasis on training for these potentially dangerous nighttime encounters.

The loss of 875 officers in a decade is, and should be, sobering to every citizen. This represents more peace officers than all but the largest communities in this country have on their rolls—it is just under the size of the largest police department in Virginia, for example.

The man who led the FBI's efforts to successfully end the gangster era's bloody reign of terrror, J. Edgar Hoover, noted in one of the first Law Day messages, "The effectiveness of law is measured by the fairness, determination, and courage with which it is enforced. . . .Our society demands of the peace officer spotless integrity, uncommon bravery, and constant devotion to duty. It is fitting that Americans pause during the year to acknowledge a debt of gratitude to those who have been faithful to their trust."

It is also fitting that the law enforcement community, represented by 15 law enforcement organizations ranging from the International Association of Chiefs of Police and the National Sheriffs' Association to the Fraternal Order of Police and the National Organization of Black Law Enforcement Executives, has organized the National Law Enforcement Officers Memorial Fund to build a memorial to the thousands of officers who have given their lives to protect their fellow citizens since our Nation began.

I wholeheartedly support this memorial. As I said at the recent dedication of the FBI's Hall of Honor for fallen Special Agents, ". . .they could have chosen professions that paid far more, demanded much less, and presented few dangers. Instead they *chose* to carry the badge . . . and accepted the responsibility to do their duty." The same words of tribute apply to every peace officer in this land of ours built on the rule of law.

William S. Sessions

William S. Sessions
Director

CRISIS
A Computer System For Major Disasters

". . . CRISIS suggests matches and lists evidence . . . it is up to a team of experts to review the case and to agree or disagree with the suggestions."

By
MARK RAND
Chief Superintendent
Kirklees Division
West Yorkshire Police
Castlegate, Huddersfield, England

On May 11, 1985, a fire swept through the crowded main stand at Bradford's Valley Parade football ground, killing 56 people and seriously injuring many more. The event was seen worldwide on television, and in an instant, West Yorkshire Police found themselves inundated with telephone inquiries from anxious relatives.

Hardly had the flames died when there was an outcry for answers to the cause of such a bizarre disaster. Foul play was the early suspicion, and a murder inquiry was soon launched. Then there was the gruesome, and at first sight, impossible task of identifying the victims.

After a meticulous and massive investigation, the cause was determined to be nonmalicious. This finding was aided by the use of MICA (Major Incident Computer Application). This system has since evolved into HOLMES (Home Office Large Major Enquiry System) which is nowadays the mainstay of murder inquiries. That left two key areas of police activity for which no computer program had been designed—the work of the Casualty Bureau and the identification of victims.

Casualty Bureau

Police assigned to the Casualty Bureau assemble lists with the names of injured, missing, and deceased individuals, as well as those who are unharmed. They also handle the vast number of telephone inquiries which any major disaster generates. The Bradford fire, unlike an air disaster, was an open incident in that there was no passenger list or its equivalent. A telephone number circulated worldwide on news bulletins resulted in numerous calls being placed to the Casualty Bureau. The lines were quickly jammed with callers. The standard documentation for the Casualty Bureau then in use required callers making a missing person report to answer at least 23 questions over the telephone. These questions sought descriptive details of the missing person and his or her clothing.

Such questioning, however, has four unwanted results. First, data acquired in this manner tend to be inaccurate. (The reader would be hard pressed at this moment to describe accurately his or her immediate next of kin, including clothing). Second, callers who are asked to provide such descriptive details begin to fear the worst.

Superintendent Rand

Third, the more details which are sought the longer the conversation, the greater the delay for other callers trying to reach the bureau. Finally, the stress to Casualty Bureau operators increases with the complexity of their task.

Casualty Bureau personnel also have to collate the information of those who were actually involved in the disaster. Documentation teams are sent to the hospitals (five in the case of the Bradford fire) to complete standardized forms of similar complexity. The completed documentation is sent to the Casualty Bureau, hopefully to be matched with missing person reports.

Identification

An early decision was made at Bradford to allocate one police officer to each dead body. That officer was instructed to visit the temporary mortuary to which the body had been removed, examine the body and its associated property, and then accompany it to the autopsy, taking copious notes throughout. With this procedure, it was believed that the officer would have the best possible description of the body in question, although in many cases that description was limited to gender, a crude estimate of height, and at times, a brief list of property.

Recovery of bodies from the scene had been meticulously documented. In no case was visual identification remotely possible, and for some, all dental evidence had been destroyed by the fire. The officers charged with this grim task then returned to the Casualty Bureau to embark on the process of comparison, elimination, and trial and error so that the most likely set of relatives could be confronted with remnants of clothing and metal objects which had survived the fire. Meanwhile, other officers had to skillfully and sensitively question relatives of those most likely to be among the dead to gather a more accurate description than the one obtained over the telephone. Figure 1 shows the methods used and their relative degrees of usefulness given the unique circumstances applying to Bradford. After 72 hours, all the dead had been identified, a remarkable result given the formidable task.

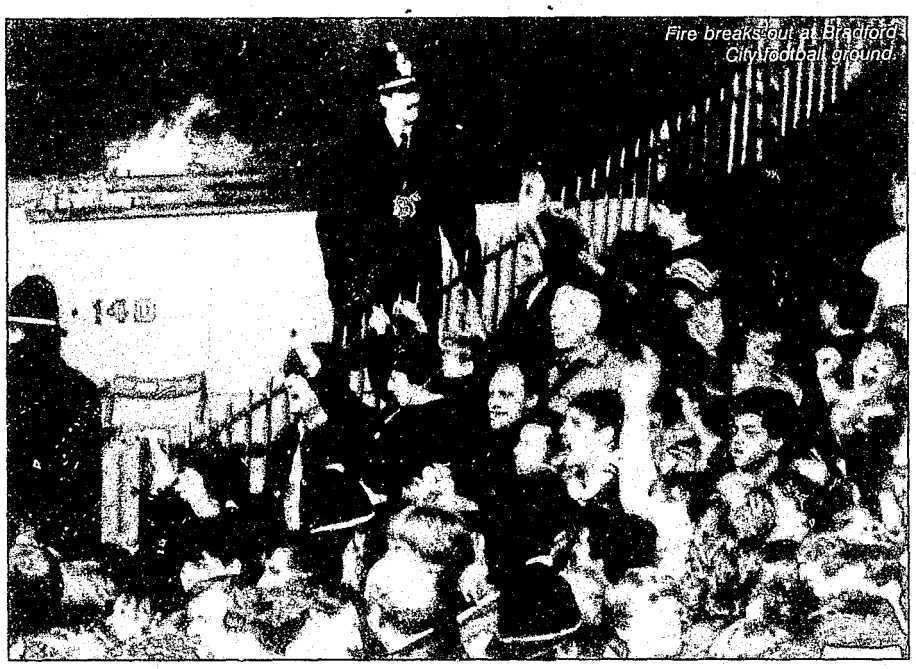
Computer Assistance at Bradford

As has already been mentioned, computer technology had been used to assist with the criminal side of the inquiry. While the Casualty Bureau was still frantic with activity, a program based on MICA was devised by the West Yorkshire Police Computer Unit in an effort to assist with identification. In theory at least, the task of matching detailed descriptions of missing people with detailed descriptions of dead bodies should be capable of computerization. Despite its hasty conception and execution, the program enabled a multitude of facts and figures to be assembled. In at least two cases, the computer was actually able to help officers identify a particular body. The only documents needed for the opening of the coroner's inquest were the computer printouts detailing in a common format the case for identification of each body.

The Development of CRISIS

The application of the computer to the aftermath of the Bradford fire produced sufficiently encouraging results to take into consideration the idea of a computer program written purposely for disasters. A small team was assembled to look at the options. This team was motivated by the Bradford experience

"[CRISIS] has the capability whereby the parameters for comparison can be varied to suit the circumstances of the disaster."



Fire breaks out at Bradford City football ground.

and a determination that something positive should, if possible, come out of the tragedy. The likelihood of West Yorkshire Police having to deal with another peacetime disaster in the future was remote, and therefore, a program specification must have wider relevance, especially since it was determined that no comparable program existed anywhere. However significant the Bradford experience, there was a danger that it would distort any computer solution toward that unique scenario. Therefore, the development team consulted with officers who had more experience in the field of disasters. In particular, advice was obtained from the Royal Air Force, British Airways, and Kenyons, London undertakers who have tended disaster victims since the 1920's.

The procedures of London Airport's Emergency Procedures Information Centre (EPIC) were also noted, since it is probably one of the most frequently tested and tried systems. Significantly, this system does not concern itself with personal descriptions for the very reason identified earlier. The EPIC documentation system seemed to be a sound basis for general use and on which to base the Casualty Bureau's aspect of CRISIS.

From the beginning, one thing was perfectly clear. Any program developed had to be sufficiently user-friendly to enable untrained staff to use it. Experience has shown this to be the case with CRISIS. Every field had behind it a "HELP" screen, whereby the operator needs only to press the key to get simple instructions to resolve any uncertainty.

West Yorkshire Police's Casualty Bureau is now fully computerized with CRISIS. Any caller reporting a missing person is asked to give only basic details such as name, address, date of birth or age, and the reason why the caller thinks that the missing person may be involved in an accident. As soon as the name is entered into CRISIS, an automatic search takes place and a list appears on the visual display unit of all those having that or a similar sounding surname who are already reported missing or listed as casualties. Callers are given a number to call in the event that the missing person should return, thereby enabling CRISIS to be quickly updated.

As a computer application, the Casualty Bureau is relatively simple; identification is a more complex problem. The CRISIS development team initially had to find adequate and widely acceptable documents. INTERPOL provided the answer, because in 1968, it produced Disaster Victim Identification (DVI) forms. For air disasters, in particular, it is vital that police forces everywhere use the same forms when obtaining full descriptions of missing persons and dead bodies. INTERPOL has since produced a comprehensive manual on identification. This system had been used successfully as a paper-only method in many international disasters, notably jumbo jet crashes at Mount Erebus, Antartica (1979), Mount Fuji, Japan (1985), and Shannon, Ireland (1985). INTERPOL is presently reviewing its DVI forms in the light of these and other experiences. Nonetheless, it was clear that CRISIS had to be capable of using the INTERPOL forms as its input documents.

Essentially, CRISIS absorbs detailed descriptions of missing persons and dead bodies and then compares them. The vague nature of the ante mortem information, in particular, makes it essential that CRISIS does not eliminate the apparently impossible on

a particular characteristic. It has the capability whereby the parameters for comparison can be varied to suit the circumstances of the disaster. Thus, for a fire, height and weight may not be too relevant, and a wide variation can be pre-set.

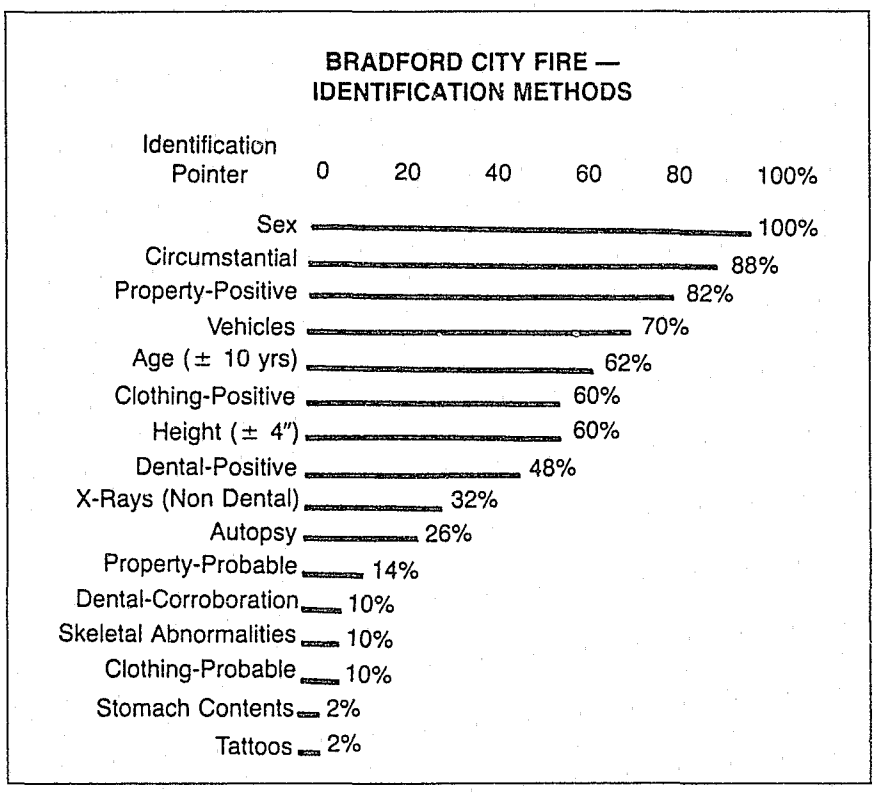
Dental chartings are compared by CRISIS using the Federation Dentaire Internationale (FDI) system of dental charting. This is the INTERPOL standard and the one which is becoming the most widely used of the six or more main dental charting systems. When ante and post mortem data are entered, CRISIS will suggest the more likely matches in descending order of probability. For physical features, such as height, weight, eye color, etc., the system lists these characteristics as "hit" or "miss" within the set parameters for the disaster. On dental matchings, it shows a mathematical match on an arbitrary points scale. It will also print out graphics of the chart for expert scrutiny.

One thing must be clear—CRISIS suggests matches and lists evidence. Thereafter, it is up to a team of experts to review the case and to agree or disagree with the suggestions. The computer can only be as good as the information entered into it. Even ante mortem dental charts have been found to be less than totally accurate. CRISIS goes some way to compensate for this by not eliminating the apparently impossible. Thus, a tooth shown on an ante mortem chart as extracted but which is very definitely present on the dead body is not rejected in the matching process. The system also accepts the fact that ocassionally, dentists have been known to make mistakes. Even so, there comes a point where the computer cannot replace human guile, intuition, and experience.

Besides the matching processes described, there is an English search facility whereby the entire data base can be searched for RED garments or individual BANK CARDS in an effort to do rapid matches on individual bodies when compared to the missing and unidentified persons.

Another large element of CRISIS is its administration package. Such mundane, though important, matters as records of employee hours worked, costs, and statistics can be entered for documentation.

Overall, CRISIS is a powerful computer system (between 0.5 and 8.0 megabytes of memory and 1 to 408 terminals connectivity) capable of bringing order to the chaos of disaster and speeding up the necessary processes of the Casualty Bureau and identification. It was tested using data from the Bradford fire and from the Manchester air disaster (August 1985) in which 54 people died when a Boeing 737 airliner caught fire on take-off.



Zeebrugge

On the evening of March 6, 1987, the Townsend Thoresen roll-on/roll-off car/passenger ferry, "Herald of Free Enterprise," left Zeebrugge in Belgium for its home port of Dover. It is now known that the ship's bow doors were open as it gathered speed. Not far past the outer harbor wall at Zeebrugge the ship capsized. It was carrying some 550 passengers and crew and its vehicle decks were laden. By far, the majority of those aboard were British, and

"CRISIS has proved to be a powerful tool for use in major disasters."

of those, the majority were from the southeast of England, Kent in particular. The disaster was clearly in Belgian waters, but the main focus was in Kent. Kent police very quickly set up a manual Casualty Bureau at their Maidstone headquarters and dispatched a number of officers to Zeebrugge.

In very much the same way as at Bradford, this was an open incident. There was no passenger list and it remains to this day impossible to say precisely how many people were on board the vessel. West Yorkshire offered CRISIS to Kent police for what seemed initially to be a straightforward, if tragic, application. In any event, West Yorkshire officers were in Kent and Zeebrugge for the next 64 days, so long was the recovery operation.

Two important decisions were made early. First, it was accepted that CRISIS would not be used in its Casualty Bureau role because of the time factor. Second, it was clear that CRISIS was under a test and would run in parallel with Kent's manual identification system. In fact, CRISIS came to be relied on more and more as the days progressed, but it would have been foolhardy in the extreme to rely from the outset on the then untried system. A key factor in the decision to use CRISIS at all came from Belgium where the Gendarmerie, charged with the identification task, were using the INTERPOL system—the very system on which CRISIS is based.

There has been much ill-informed and insensitive criticism of the efforts which were made to produce an accurate list of casualties and survivors. Heroic efforts were made by several agencies in Belgium to produce accurate lists but language differences, coupled with the urgency of the rescue need, conspired toward duplication and confusion. The resulting data had to be regarded with caution, and despite the earlier decision not to use CRISIS in the Casualty Bureau role, its facilities were in fact used to assist.

It was in its identification role that CRISIS was put to a rigorous test. As they were recovered from the ship, bodies were taken to Zeebrugge Naval Base where every detail of the physical description, property, and clothing was recorded by Gendarmerie officers onto INTERPOL forms. Bodies were also photographed and fingerprinted. The forms were completed in Flemish and faxed to Maidstone from Zeebrugge. As a precaution, copies were also sent on the overnight ferry to Dover. A similar process took place in reverse; the night ferry from Dover brought completed ante mortem forms for the Gendarmerie.

Thus was set up a parallel identification operation in England and Belgium with a mutual and total sharing of information. Interpreters translated the forms into English. After the recovery of 53 bodies, it became clear that the risk to the divers was such that no more bodies could be recovered safely until the ship was brought upright. That process took several weeks, during which there was time to take stock of identification procedures. While the bodies initially recovered were suitable for visual identification, it seemed obvious that as time passed, the other bodies would be less readily identifiable. As soon as the first 53 bodies had been identified, the CRISIS forms were themselves translated into Flemish. Thereafter, all of the 135 bodies later recovered were documented in English by the Gendarmerie onto CRISIS forms. All the documents were faxed to England for assimilation into the manual system and into CRISIS. For operational reasons, the Identification Bureau was moved to the Dover police station.

It was possible during the course of the incident to modify and improve the computer programs. A property index was written to handle the large amount of identifiable property recovered from the seas around the Herald of Free Enterprise; passports in particular were entered in this index. More importantly, dental charts were put into CRISIS at Dover by a small team of odontologists who encoded ante mortem dental charts obtained from British dentists and the post mortem chartings faxed across from Zeebrugge. All of the recovered bodies have been identified.

Conclusion

CRISIS has proved to be a powerful tool for use in major disasters. It is capable of being used by a staff who, though familiar with computers in a general way, are not necessarily conversant with CRISIS. After minimal training by West Yorkshire officers, the system was used most proficiently by Kent policemen who, before the disaster, had no knowledge whatsoever of CRISIS. The system is simple, yet effective, and a number of police forces in the United Kingdom and elsewhere are installing it. Further details on CRISIS can be obtained from:

ISIS Computer Service
Elton House
12 Gloucester Road
Bishopston
Bristol
Avon, BS7 8AE
Telephone: (0272) 428191
Telex: 449071
Fax: 425752

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